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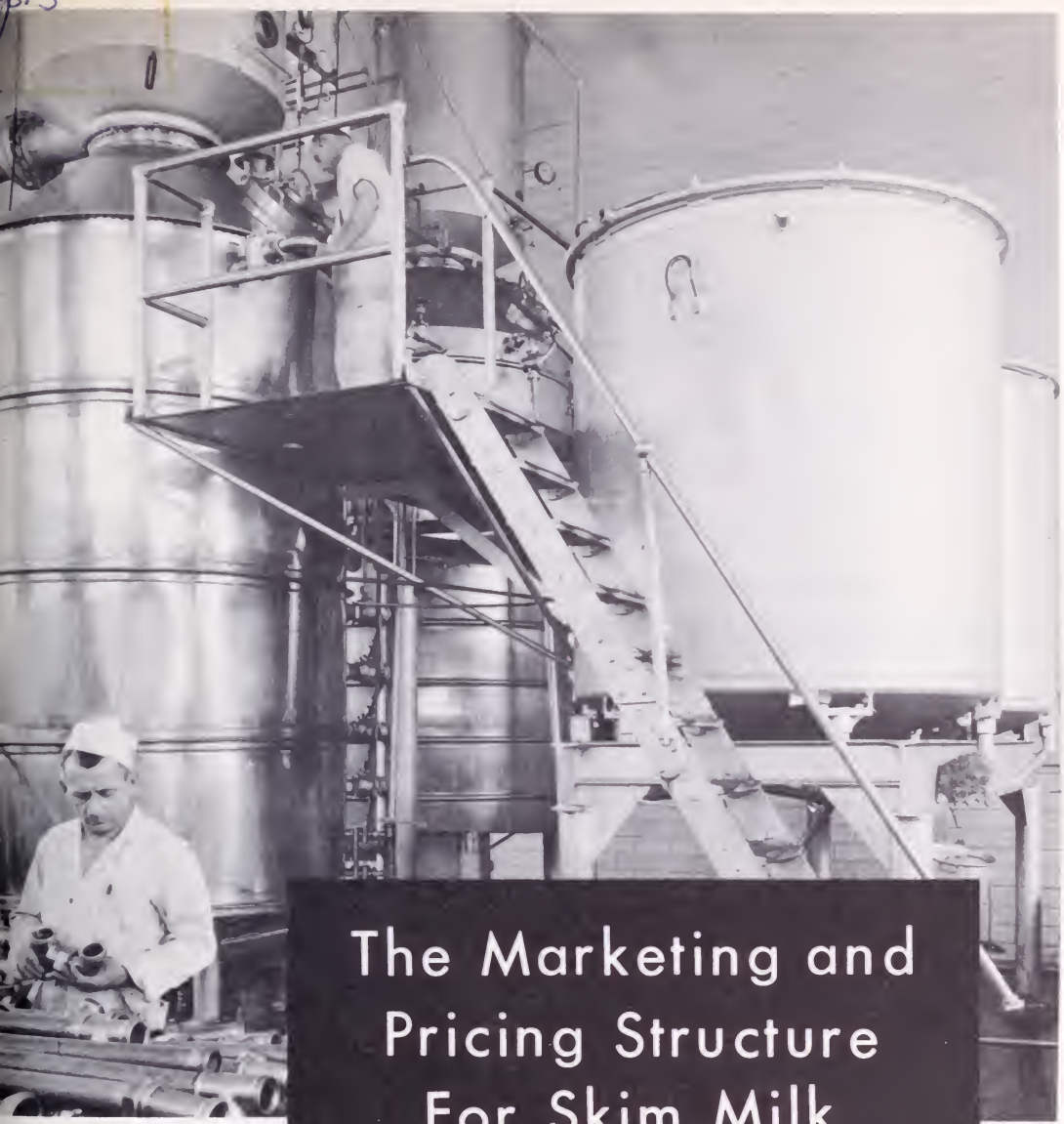

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U. S. DEPARTMENT OF AGRICULTURE

The Marketing and Pricing Structure For Skim Milk Products in

Kansas, Missouri, and Oklahoma Markets

Marketing Research Report No. 166
Agricultural Marketing Service
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PREFACE

This report analyzes the marketing and pricing structure of plain condensed skim milk and of spray and roller process nonfat dry milk solids. This structure is one of the important factors to be considered in pricing "surplus" milk. The study was made of fluid milk markets in Kansas, Oklahoma, and Northwestern Missouri, all of which have Federal milk marketing orders. An analysis of the marketing and pricing structure for bulk sweet cream has already been published in Marketing Research Report No. 74. That Report and this one provide information about the prices received by handlers and nonhandlers for the major products manufactured from surplus milk. These studies are a part of a series with the ultimate objective of developing criteria and practicable methods for determining equitable prices for such milk in this area.

Other aspects of the overall problem include such considerations as: (1) The organization and operating and pricing practices of the present marketing system for reserve and surplus milk, (2) prices received by handlers and nonhandlers (that is, plants not under Federal regulation) for products which may be made from such milk, (3) prices and other costs of emergency supplies that might be used in lieu of carrying a seasonal reserve, (4) costs incurred by handlers and nonhandlers in processing reserve and surplus milk, (5) accessibility of facilities, other than handlers' own plants, for processing reserve milk, together with costs and problems involved in their use, (6) response of handlers and potential handlers to changes in price levels for reserve and surplus milk, and (7) prices paid by unregulated milk plants for milk going into the same products for which reserve and surplus milk usually is used. Findings on these separate aspects, brought into proper relationship with one another and with the major objectives of pricing milk in the fluid markets of this area, would provide the basis for improvements in the pricing of this class of milk.

The Department of Agricultural Economics at Kansas State College cooperated in the survey on which this report is based. Paul L. Kelley participated in the general planning of the study and aided in the field work. Howard L. Hall interviewed operators of about half of the plants studied.

Thanks are due the managers and personnel of the plants for their patient cooperation.

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SUMMARY

The prices of plain condensed skim milk and nonfat dry milk in Kansas, Missouri, and Oklahoma bore no fixed relation to prices of nonfat dry milk in Chicago during 1951-54. Since these products are important outlets for surplus skim milk in the area, it appears that a report of local wholesale prices of such products should be considered as a factor in pricing surplus milk.

Among the skim milk products considered, plain condensed skim milk is the one for which it would be most suitable to report local wholesale prices periodically. Plain condensed milk was sold by more firms than was nonfat dry skim milk; also more transactions were conducted with it. Milk solids in plain condensed skim milk were consistently higher priced than nonfat dry milk.

Some features of the local wholesale market for skim milk products would affect ways in which prices might be reported or used: (1) The number of sales per day was small (fewer, for example, than sales of bulk sweet cream); (2) there was a wide variation among the selling prices of the various sellers; and (3) the proportion of the total volume sold by various sellers varied from day to day or week to week so that weighted average prices tended to vary substantially from this cause alone.

Other characteristics of the local market were: (1) Volume of plain condensed skim milk sales fluctuated less than either roller or spray process nonfat dry milk; (2) average quantity per sale of skim milk products was larger than per sale of butterfat in cream; and (3) prices of skim milk solids products varied by type of seller and type of buyer.

The basic data for this study were obtained from 15 firms in the South Central area which sold 23,369,349 pounds of serum solids in 1951. Limited comparisons were made for 1952, 1953, and 1954. In 1951 the plants studied sold slightly more plain condensed skim milk than spray process nonfat dry milk, and about three-fifths as much nonfat dry milk as either of the other products. Prices for nonfat dry milk in the South Central area averaged about one-half cent per pound higher than in Chicago during 1951, but were 0.7 to 0.8 cent per pound lower in 1953. Prices of plain condensed skim milk averaged about 1.1 cents per pound of serum solids higher than the national average of prices received by manufacturers in 1951.

Skim milk products were sold throughout the year in 1951, but the volume was less in the fall and early winter months than at other times. Furthermore, there was a seasonal shift among products. Plain (unsweetened) condensed skim milk was manufactured and sold without any storage program. Sellers of both types of nonfat dry milk did some storing. Sales of plain condensed skim milk depended upon the immediate supply of milk for this purpose, whereas sales of nonfat dry milk could be based upon stored products. While bakers and meat packers used nonfat dry milk almost exclusively as a source of serum solids, ice cream manufacturers used all three types of skim milk products. This ability to use any of the available skim milk products

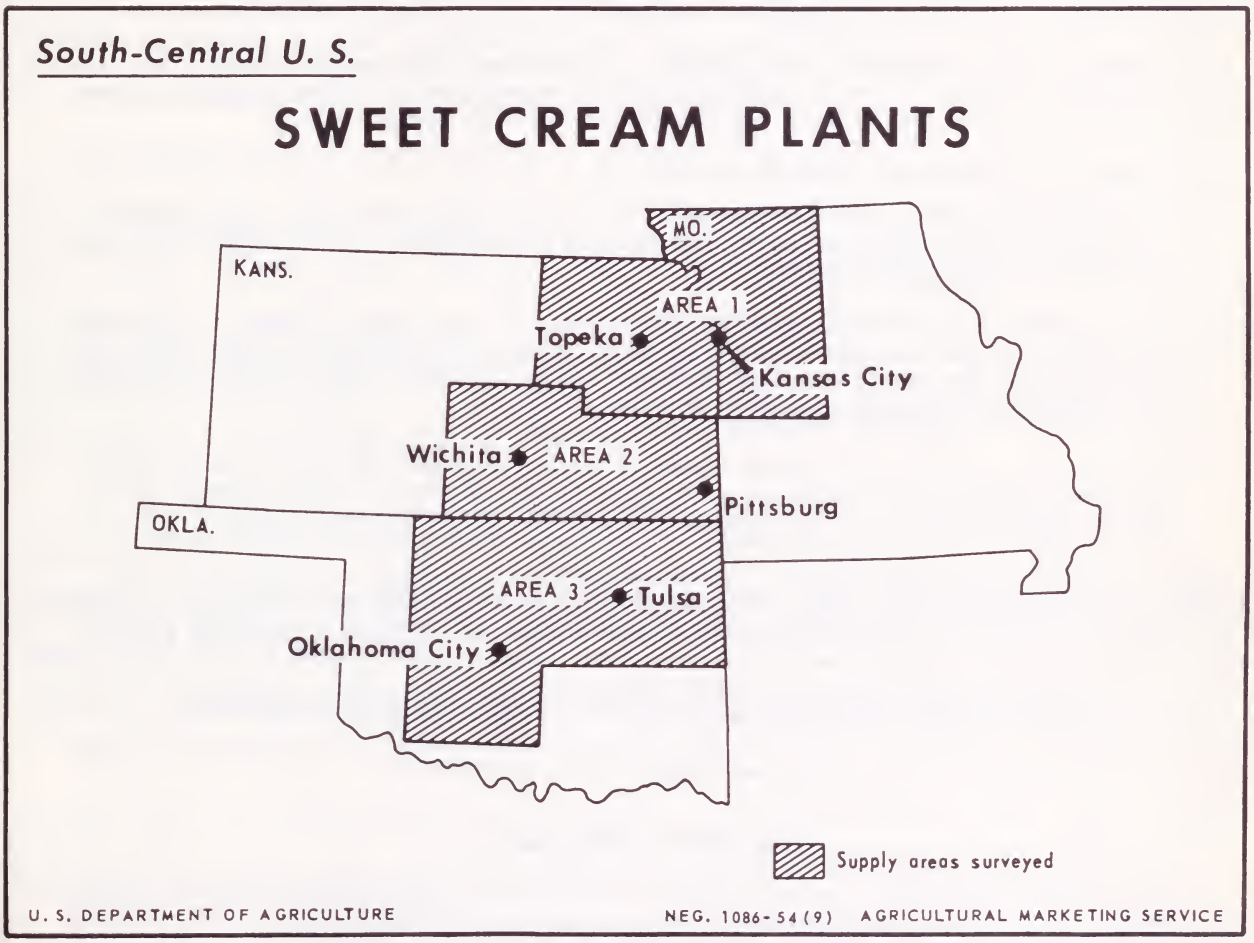
tended to keep prices for each product closely related, although during the year prices of plain condensed skim milk did vary from the general trend experienced for nonfat dry milk. The changes in relative values during 1951 and from year to year during 1951-54 ranged roughly from 1 to 2 cents a pound of serum solids, or 8 to 16 cents a hundred pounds of milk.

THE MARKETING AND PRICING STRUCTURE FOR SKIM MILK PRODUCTS IN KANSAS, MISSOURI, AND OKLAHOMA MARKETS

By Homer J. Preston,
Alexander Swantz, and Louis F. Herrmann[1]

INTRODUCTION

This report presents an analysis of the marketing and pricing structure for skim milk (serum solids) products in the South Central area of the United States. The area includes the fluid milk markets and the milksheds for Greater Kansas City and Neosho Valley, in Missouri and Kansas; Topeka and Wichita, in Kansas; and Oklahoma City and Tulsa-Muskogee in Oklahoma (fig. 1).



All of these markets have Federal milk marketing orders. One of the provisions of each order fixes the price of surplus milk at the average of prices paid by unregulated plants in the area, or uses such prices as one of several alternative pricing bases. The prices that these unregulated plants can pay for milk depend to a large extent on the prices they can obtain for the products which they make from it. Regulated plants may be unable to pay as much if they cannot sell the same products for the same prices unregulated plants receive. It becomes important to describe the selling prices received by both regulated and unregulated plants.

[1] Dr. Herrmann is agricultural economist with Market Organization and Costs Branch, Marketing Research Division. Drs. Preston and Swantz were formerly with this Branch.

During World War II fluid milk markets in the South Central area experienced severe seasonal shortages of milk from local sources. Following the war, these markets tried to develop adequate supplies of Grade A milk in all seasons of the year. The increased emphasis on Grade A milk production resulted in greater quantities of reserve and surplus milk--the new supplies being used partly for fluid uses in the fall, but entirely for manufactured products in the spring. The changed importance of this class of milk in the South Central market makes it important to evaluate the pricing basis under current conditions.

Definition of Reserve and Surplus Milk

In its broadest sense, and through common usage, the term "surplus" milk generally is understood to mean all milk regularly produced and delivered to distributors in a marketing area which exceeds the amount sold as fluid milk, fluid cream, and related fluid products.

In stricter terms, however, this "surplus" has three components. Each component is a result of the peculiar structure of fluid milk markets, and a close analysis shows that separate marketing and pricing problems and criteria apply to each.

The three components of "surplus" milk are:

1. That milk in excess of handlers' daily sales of fresh milk and cream must be carried by distributors to cover day-to-day fluctuations in sales. This may be called the "operating reserve."

2. That milk in excess of daily sales and the daily "operating reserve" which must be carried by the market because of wide seasonal variation in milk production and a relatively steady seasonal demand for fluid milk products. This milk may be called the "seasonal reserve."

3. That milk in excess of (a) daily sales, (b) the operating reserve, and (c) the seasonal reserve. This milk is in excess of the market's normal fluid and reserve requirements, and is surplus milk in the more general sense.[2]

The "operating reserve" and the "seasonal reserve" perform a service that is valuable to the users of fluid milk, assuring them that fluid milk will always be available. On the other hand the pricing and disposal of this milk may become a problem since it must be marketed in much the same manner as the true surplus. Sales of milk in excess of fluid needs may be in the form of whole milk to other plants, whole milk products such as evaporated milk or cheese, or as concentrations of the component parts of milk. For example, butter or cream are used for the disposal of the butterfat portion of milk and plain condensed skim milk or spray and roller process nonfat dry milk for the nonfat portion.

Purpose of This Study

As the quantity of surplus milk in each of the markets in the South Central area has increased there has been a growing need for an evaluation of the bases used for pricing such milk. One important basis for pricing is the value received, in the area, from manufactured dairy products.

The difference between products made from the butterfat and the nonfat portion of excess milk necessitates different marketing and pricing structures. For this reason separate analyses were made for each portion of the whole milk. The analysis of the marketing and pricing structure for bulk sweet cream has been reported previously.[2] One purpose of the present report is to supply the same type of information for plain

[2] These definitions are the same as those used in "The Marketing and Pricing Structure for Bulk Sweet Cream in Kansas, Missouri, and Oklahoma Markets." Alexander Swantz, Marketing Research Report No. 74, U. S. Department of Agriculture, Agricultural Marketing Service, Washington, D. C., November 1954.

(unsweetened) condensed skim milk and spray and roller process nonfat dry milk in the South Central area. These are the major skim milk products manufactured in that area. Two additional products account for significant quantities of this class of milk: Cottage cheese and ice cream. These two products do not have well defined wholesale markets, and were excluded from this study. A further purpose of this study is to describe various price relationships among skim milk products, and among prices paid in the South Central area and in other regions in the United States. Knowledge of such relationships may provide a basis for changes in pricing practices or distribution practices.

Scope and Method of Analysis

This report presents an analysis of invoice data from 15 major plants manufacturing skim milk products in the South Central area. Invoice data were for 1951 and included each sale by each plant in the study. The information obtained included date of sale, invoice price, quantity of product, basis for pricing, method of shipment, amount of transportation charges, type and location of buyer, and any premiums or discounts. A questionnaire was used to obtain additional data on pricing bases and other circumstances of the sale that could not be ascertained from the invoices.

The analysis was confined to sales of manufactured skim milk products. Prices of such sales in areas where an important proportion of the total milk was utilized for fluid milk sales may have special characteristics. Excess skim milk above fluid milk requirements can be expected to be utilized first in dairy products supplementing fluid milk sales such as cottage cheese. However, when supplies exceed the sales in these supplemental outlets, the skim milk is used for other manufactured dairy products, condensed and dried. In seasons of short supplies these same plants may enter the market as buyers of skim milk products to obtain the necessary supplies for those products supplementing their fluid milk sales. The changing status of these fluid milk markets may affect seasonal fluctuations in prices. The magnitude of this effect on prices could not be measured, but a seasonal change in types of sellers and buyers was evident, thereby giving the market area special characteristics.

For this study, all prices were converted to a basis of f.o. b. the seller's plant. Prices of plain condensed skim milk are given as prices per pound of solids content (skim milk, or serum, solids). Trade practice varies as to unit of sale and unit of pricing. Some sales were by total weight of condensed skim milk, some by weight of solids content, and some by the 10-gallon can, considered to contain 90 pounds of condensed skim milk of 35 percent solids.

ORGANIZATION OF THE MARKET FOR SKIM MILK PRODUCTS

Characteristics of Selling Firms

All plants in the South Central area known to have made sales of either bulk cream or skim milk products were visited. A total of 23 plants made some sales and supplied the necessary invoice data. Of the 23 plants, 15 made some sales of plain condensed skim milk or of nonfat dry milk.

When plants were grouped by type of operation, the average quantity sold per plant was largest for plants making nonfat dry milk (table 1). Plants which made only plain condensed skim milk sold less skim milk products annually per plant than plants which made other products.[3]

The small volume of condensed skim milk sales in plants processing only one skim milk product can be expected since such equipment is more suitable for small volume operations than is milk drying equipment. Plants having fluid milk as their main source of sales may have limited volumes and intermittent need for condensing facilities. Plants

[3] Throughout this report quantities of plain condensed skim milk are reported in terms of the pounds of milk solids (serum solids) contained. The usual proportion of solids is 35 percent.

Table 1.--Skim milk products: Number of plants and quantities sold, by type of operation, South Central area, 1951

Type of operation	Plain condensed skim milk			Spray process nonfat dry milk		
	Plants	Total quantity	Average quantity	Plants	Total quantity	Average quantity
	Number	*1,000 pounds*	*1,000 pounds*	*Number*	*1,000 pounds*	*1,000 pounds*
Plain condensed skim milk	4	1,381	345	---	---	---
Plain condensed and spray	4	4,634	1,158	4	3,817	954
Spray and roller	---	---	---	3	4,417	1,472
All other	3	3,094	1,031	2	713	356
All	11	9,109	828	9	8,947	994
	Roller process nonfat dry milk			All products		
Plain condensed skim milk	---	---	---	4	1,381	345
Plain condensed and spray	---	---	---	4	8,451	2,112
Spray and roller	3	4,316	1,439	3	8,733	2,911
All other	4	998	249	4	4,805	1,201
All	7	5,314	759	15	23,370	1,558

with facilities to process several types of skim milk products also produced relatively large quantities of plain condensed skim milk.

Seven plants were not under a Federal milk marketing order. These plants are referred to as "nonregulated" (table 2). Of the eight plants that were "regulated", one had its entire operation under Federal regulation. The others had the Grade A operation under Federal regulation but their manufacturing operations were not regulated. The regulated plants sold far less skim milk products than the nonregulated plants. All except one of the regulated plants had some sales of plain condensed skim milk. Thus, the manufacturing operations of regulated plants were neither large nor particularly diversified.

Sales from regulated plants constituted less than 20 percent of the total volume of serum solids sold by the plants studied. The regulated plants had about 30 percent of the plain condensed skim milk but less than 7 percent of the spray process nonfat dry milk sales. Thus, the price level for plain condensed skim milk would be of greater direct concern to the regulated plants than would the price level for other serum solids products. However, the interchangeability of various skim milk products for some uses makes them all nearly of equal importance for purposes of this study.

Although the sales of skim milk products from regulated plants were small, there may have been sizeable supplies of milk and milk products in excess of fluid milk requirements diverted or sold to nonregulated plants to be manufactured into such products. Such transfers considered, the importance of the regulated plants as sources of supply would be greater than indicated by their sales of the finished products. Such transfers also indicate the need for careful alinement of milk prices to regulated plants with those at nonregulated plants.

Table 2.--Comparison of annual plant sales by type of product for regulated and nonregulated plants, South Central area, 1951

Status under Federal milk marketing orders	Type of serum solids product					
	Plain condensed skim milk			Spray process nonfat dry milk		
	Plants	Total volume	Average volume	Plants	Total volume	Average volume
	Number	*1,000 pounds*	*1,000 pounds*	*Number*	*1,000 pounds*	*1,000 pounds*
Nonregulated.....	4	6,359	1,590	7	8,366	1,195
Regulated.....	7	2,750	393	2	581	291
All.....	11	9,109	828	9	8,947	994
	Roller process nonfat dry milk			All products		
Nonregulated.....	5	5,202	1,040	7	19,927	2,847
Regulated.....	2	112	56	8	3,443	430
All.....	7	5,314	759	15	23,370	1,558

Surplus Utilization Policy

Sellers of skim milk products in the South Central area stated that it was their policy to produce plain condensed skim milk for local market needs. Where more than one nonfat product was produced, sellers consistently rated plain condensed skim milk as their first choice. Other nonfat products were made only as surplus skim milk exceeded local market needs for plain condensed skim milk. Furthermore plain condensed skim milk was consistently produced only for current needs, none being stored. On the other hand, both spray and roller process nonfat dry milks were stored for use when skim milk products were scarce.

Sellers' Pricing Policy

Of the 15 sellers included in the study, 12 gave specific information on their current pricing policies. Most sellers negotiated the price for each shipment. However, two sellers established prices on the basis of a fixed relationship with the Government support price for nonfat dry milk. This price policy was followed for only a limited number of their regular buyers.

In negotiating the price for each shipment all sellers used the quoted price for "brand name" nonfat dry milk or the Chicago and New York published prices for nonfat dry milk as the major basis in establishing prices. In addition each seller made some evaluation of supply-demand conditions as a basis for adjusting prices.

The sellers' evaluation of national supply and demand conditions was based upon reports published in trade papers and reports of the U. S. Department of Agriculture. The local supply and demand conditions were judged on the basis of the individual seller's local trade contacts. One seller had the policy of following the price changes of another seller in the local area. In general however, sellers negotiated prices on the basis of their individual evaluation of local supply and demand conditions, with some consideration of the prices of serum solids at the national level.

In spite of the uniformity in stated price policies among sellers, differences in the prices received were evident. For example, the average annual price per pound of serum solids in plain condensed skim milk varied from 11.97 cents for the seller with the lowest price to 17.50 cents for the one with the highest. A wide variation in prices was also evident on a monthly basis. Sellers of other skim milk products also had a wide variation in

prices. Thus, assuming that prices were established according to the stated policy, the variation in prices received by the sellers would be the result of their evaluation of local supply-demand conditions, and of differences in quality, volume and regularity of sales.

These pricing policies were found in interviews made during 1952, and they probably were influenced by the overall supply-demand conditions of the period. During 1951 sellers did not have enough condensed or dried skim milk to supply all firms that asked for some. They sold no nonfat dry milk to the Government under the price support programs. This indicated that supplies of skim milk products in the area were relatively limited for the potential market.

Importance of Different Types of Buyers

Sales were made to many types of buyers and the importance of the different types of buyers varied for each of the skim milk products (table 3). Buyers with some type of ice cream operation were the major buyers of these products. Bakeries and meat packers were important sales outlets for nonfat dry milk but not for plain condensed skim milk. Buyers with both fluid milk and ice cream operations made important purchases of both nonfat dry milk and plain condensed skim milk. Buyers with retail ice cream operations (counter freezers) were a major sales outlet for roller nonfat dry milk. While the most important type of buyer varied for each serum solids product, some buyers made purchases of all products. Thus, all these products were possible sources of supplies for certain types of buyers, tending to insure close price relationships.

Table 3.--Skim milk products: Quantities sold, by type of buyer, South Central area, 1951

Type of buyer	Plain condensed skim milk		Spray process nonfat dry milk		Roller process nonfat dry milk		All products	
	1,000 pounds	*Percent*	*1,000 pounds*	*Percent*	*1,000 pounds*	*Percent*	*1,000 pounds*	*Percent*
Fluid milk and ice cream plant.....	2,835	31	849	10	326	6	4,010	17
Bakery.....	([1])	([2])	2,384	27	763	14	3,147	13
Ice cream plant-wholesale.....	2,382	27	572	6	29	1	2,983	13
Multiple use manufacturing plant with ice cream.....	1,275	14	1,052	12	160	3	2,487	11
Ice cream plant-retail.	---	---	403	4	1,892	35	2,295	10
Meat packer.....	---	---	1,087	12	866	16	1,953	8
Broker.....	1,475	16	335	4	27	1	1,837	8
All other.....	1,142	12	2,265	25	1,251	24	4,658	20
All buyers.....	9,109	100	8,947	100	5,314	100	23,370	100

[1] Less than 500 pounds.
[2] Less than 0.5 percent.

The seasonal pattern of sales varied by type of buyer. Sales to all types of buyers were relatively infrequent compared to sales of bulk cream. The changes in volume of purchases from month-to-month may not reflect a true seasonal pattern, but only the effect of intermittent purchases.

During 1951 buyers with some type of a fluid milk operation tended to reduce purchases during May and June (Appendix, Table 18). These same buyers increased their purchases during the fall months. Volume of sales by other buyers had month-to-month fluctuations, but little evidence of a seasonal pattern.

Location of Buyers

Skim milk products from the South Central area were sold to buyers located in at least 20 different States (tables 4, 5). Over 65 percent of the total quantity was sold to buyers in Texas, Missouri and Kansas. Total sales to buyers in other States were small, but they indicate the potential sales area.

Sales of skim milk products to buyers in specific States varied by type of product. Plain condensed skim milk sales were largely confined to buyers in Texas, Missouri and Kansas, confirming sellers' statements that they produced plain condensed skim milk mainly for the local market. In contrast, important sales of roller process nonfat dry milk were made in a large number of States, Sales of both spray and roller process nonfat dry milk were made over a wide area.

Numbers and Sizes of Individual Transactions

Records were obtained for 9,590, 2,251 and 749 individual transactions involving plain condensed skim milk, and spray and roller process nonfat dry milk, respectively (table 5). The average quantity per sale of plain condensed skim milk was 950 pounds of serum solids; of roller process nonfat dry milk, 7,095 pounds, and of spray process nonfat dry milk, 3,975 pounds. In general, sales to buyers located within the South Central area were smaller than those to buyers from the more distant States.

Transactions with buyers from States outside the South Central area were infrequent and large. Furthermore, buyers located outside the South Central area usually bought from only one seller in the area and many made only one purchase during the year. Buyers within the South Central area made relatively small and numerous purchases. The large, infrequent purchases from outside the area could have a strong effect on prices. Thus, changes in prices or quantities during the 1951 period would not necessarily be a clear indication of month-by-month price changes for future time periods.

Table 4.--Skim milk products: Sales to buyers in specified States from sellers in the South Central area, 1951

State	Plain condensed skim milk		Spray process nonfat dry milk		Roller process nonfat dry milk		All products	
	1,000 pounds	Percent	1,000 pounds	Percent	1,000 pounds	Percent	1,000 pounds	Percent
Alabama.....	---	---	---	---	440	8	440	2
Arkansas.....	263	3	298	3	17	(1)	578	2
California.....	---	---	125	1	300	6	425	2
Colorado.....	225	2	83	1	10	(1)	318	1
Florida.....	---	---	250	3	360	7	610	3
Illinois.....	---	---	383	4	234	4	617	3
Kansas.....	1,161	13	2,488	28	571	11	4,220	18
Louisiana.....	---	---	---	---	409	8	409	2
Missouri.....	1,916	21	2,890	33	661	12	5,467	23
Nebraska.....	729	8	627	7	271	5	1,627	7
New York.....	---	---	---	---	100	2	100	(1)
Oklahoma.....	464	5	557	6	1,007	19	2,028	9
Pennsylvania....	---	---	---	---	396	8	396	2
Texas.....	4,263	47	968	11	394	7	5,625	24
All others.....	88	1	278	3	144	3	510	2
Total.....	9,109	100	8,947	100	5,314	100	23,370	100

[1] Less than 0.5 percent.

Table 5.--Skim milk products: Number of buyers, and average quantity per sale to specified States, South Central area, 1951

State	Plain condensed skim milk			Spray process nonfat dry milk			Roller process nonfat dry milk		
	Number of buyers	Number of sales	Average size of sale	Number of buyers	Number of sales	Average size of sale	Number of buyers	Number of sales	Average size of sale
	Number	*Number*	*Pounds*	*Number*	*Number*	*Pounds*	*Number*	*Number*	*Pounds*
Alabama	---	---	---	---	---	---	1	12	36,667
Arkansas	8	281	936	5	28	10,657	2	12	1,417
California	---	---	---	2	2	62,538	2	5	60,000
Colorado	5	144	1,564	4	7	11,875	1	10	1,040
Florida	---	---	---	1	13	19,223	2	10	36,020
Illinois	---	---	---	5	20	19,135	3	10	23,400
Kansas	54	3,355	346	85	927	2,684	35	197	2,900
Louisiana	---	---	---	---	---	---	3	13	31,492
Missouri	23	1,715	1,117	78	720	4,016	20	127	5,204
Nebraska	10	569	1,282	17	101	6,203	10	54	5,014
New York	---	---	---	---	---	---	3	4	25,000
Oklahoma	30	1,296	358	38	257	2,166	14	250	4,020
Pennsylvania	---	---	---	---	---	---	3	9	44,044
Texas	31	2,135	1,996	29	140	6,912	8	21	18,762
All other	7	95	931	12	36	6,586	11	15	9,634
All	168	9,590	950	276	2,251	3,957	118	749	7,095

MONTHLY AVERAGE PRICES

Prices Received by All Sellers and the Largest Sellers in 1951

The 3 to 5 sellers having the largest volume of sales for each of the skim milk products accounted for 81, 75, and 96 percent of the total annual sales of plain condensed skim milk, and of spray and roller process nonfat dry milk, respectively. The weighted average prices received by these dominant sellers followed closely the weighted average price for all sellers (table 6). The largest difference was less than one-half cent per pound (spray process nonfat dry milk), in March. Since the selected sellers represented a large proportion of the total sales for each product this could be expected.

Two main factors occasionally tended to widen the differences between the average price received by large sellers and that average price received by all sellers. The first was that in some months, the group of "large" sellers dropped to a small percent of the total sales. That is, the relatively small or infrequent sellers did nevertheless constitute a large proportion of the total sales in some months. Second, there were variations in prices among the larger sellers. When a specific seller had both a large proportion of the total sales and a relatively large difference in price from the weighted average for the area, the difference in prices between the two series widened. Sales of skim milk products are relatively large and intermittent. Hence, it is evident that the two factors cited above would become increasingly important, and that prices would diverge more widely and frequently if the reporting period were reduced from a monthly to a weekly or daily basis.

The average prices for the large sellers more nearly reflected the weighted average level and changes in prices of skim milk products in the South Central area than did the prices for comparable products in the Chicago area, or nationally (table 6). Chicago area prices for nonfat dry milk solids averaged about one-half cent per pound under prices in the South Central area. Prices received by manufacturers for plain condensed skim milk nationally were about 1.1 cents under those in the South Central area. In some months, powder prices in the Chicago area were three-fourths to 1 cent or more below those in the South Central area, and local and national prices of plain condensed skim milk diverged nearly 2 cents.

General Price Comparisons

Prices of skim milk products rose in the first quarter of 1951, leveled out, then rose further in the last half of the year (table 6 and fig. 2). The pattern differed somewhat among the products and also among areas.

Prices for spray and roller process nonfat dry milk in the South Central area were above the Chicago area prices in general. However, from May through August prices in the South Central area declined while the Chicago area price remained steady. The price of roller process nonfat dry milk in the South Central area was actually lower than the Chicago area price in August. These relationships indicate that generally the South Central prices are the Chicago area price plus transportation costs. But during periods of relatively heavy supplies, prices in the South Central area may tend to drop to the Chicago price minus transportation costs.

Prices received in the South Central area expressed as a percent of the Chicago area price for spray process nonfat dry milk show more clearly than do actual prices the relationship between this price series and those in the South Central area. Prices for spray process nonfat dry milk in the South Central area were consistently higher than those in the Chicago area (table 7). As could be expected, prices for roller process nonfat dry milk in the South Central area were relatively lower than prices for spray process nonfat dry milk in the Chicago area. Prices for serum solids in plain condensed skim milk were lower than the Chicago area price for spray process nonfat dry milk from April through September and higher during other months; however, all skim milk products in the South Central area declined relative to the Chicago area price of spray process

Table 6.--Skim milk products: Average prices for all sellers and for largest sellers, South Central area, prices of spray powder and roller powder at Chicago and plain condensed skim milk nationally, by months, 1951

Month	Plain condensed skim milk		Spray process nonfat dry milk		Roller process nonfat dry milk		Spray process nonfat dry milk at plants in the Chicago area[4]	Roller process nonfat dry milk at plants in the Chicago area[4]	Plain condensed skim milk nationally[5]
	All sellers	Five largest[1]	All sellers	Four largest[2]	All sellers	Three largest[3]			
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
January.....	13.9	14.0	13.2	13.5	11.7	11.4	12.7	10.9	13.0
February.....	14.2	14.4	13.7	13.8	11.7	11.5	13.2	11.4	13.1
March.....	14.3	14.4	14.1	14.3	12.2	12.1	13.6	11.7	13.2
April.....	14.3	14.4	15.2	15.3	13.4	13.2	14.8	12.5	13.2
May.....	14.1	14.4	15.6	15.8	13.7	13.6	14.9	13.0	13.3
June.....	14.0	14.3	15.4	15.8	13.5	13.4	14.8	13.0	13.2
July.....	14.1	14.5	15.3	15.3	13.4	13.3	14.9	13.1	13.2
August.....	14.3	14.7	15.3	15.2	13.2	13.1	15.0	13.2	13.4
September.....	14.7	14.9	15.3	15.2	13.6	13.3	15.0	13.2	13.4
October.....	15.1	15.1	15.8	15.7	13.8	13.6	15.0	13.6	13.4
November.....	15.1	15.1	16.0	16.0	14.0	13.7	15.0	13.9	13.6
December.....	15.7	15.7	16.1	16.1	14.7	14.7	15.0	14.0	13.7
Annual average.	14.4	14.6	15.0	15.1	13.3	13.0	14.5	12.8	[6] 13.3

[1] Five largest sellers sold 81 percent of all plain condensed skim milk.
[2] Four largest sellers sold 75 percent of all spray process nonfat dry milk.
[3] Three largest sellers sold 96 percent of all roller process nonfat dry milk.
[4] Average of weekly quotations reported by the "Chicago Weekly Dairy Market Review," Agr. Mktg. Service, as computed by the Program Analysis and Development Branch, Dairy Division, AMS.
[5] Computed from manufacturers' selling price of bulk plain condensed skim milk in "Milk Products," U. S. Dept. Agr. Bur. Agr. Econ., Washington, D. C. Feb. 1953. On basis of 35 percent serum solids in plain condensed skim milk.
[6] Unweighted average of monthly prices.

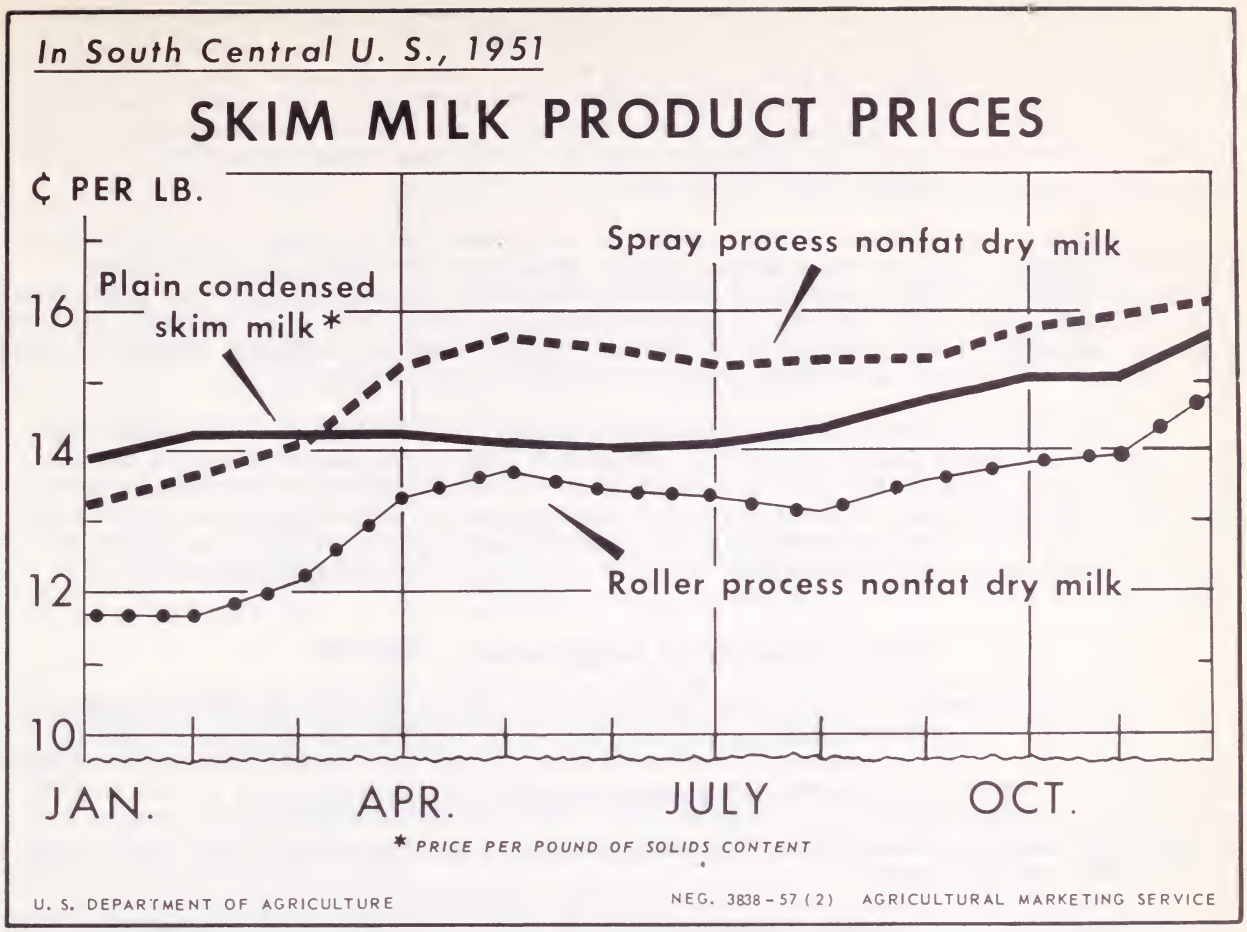


Table 7.--Skim milk products: Prices received in the South Central area expressed as a percent of the price of spray process nonfat dry milk at plants in the Chicago area, by months, 1951

Month	Plain condensed skim milk	Spray process nonfat dry milk	Roller process nonfat dry milk
	Percent	*Percent*	*Percent*
January	110	104	92
February	108	104	89
March	105	104	90
April	96	103	90
May	95	105	92
June	95	104	91
July	95	102	90
August	96	102	88
September	98	103	91
October	100	105	92
November	101	107	93
December	104	107	98
Average	100	104	92

nonfat dry milk during July and August. For plain condensed skim milk this relative decrease in price extended from April through September. There was a closer relationship between the Chicago area price for spray process nonfat dry milk and the South Central area prices for nonfat dry milk than for plain condensed skim milk. Fluctuations in the price relationship between plain condensed skim milk in the South Central area and the price of spray process nonfat dry milk in the Chicago area reflect the local nature of the plain condensed skim milk market.

In summary, prices for nonfat solids in the South Central area followed slightly different seasonal patterns than did prices for spray process nonfat dry milk in the Chicago area. The notable difference was the relatively reduced prices in the South Central area during July and August. When production and sales were high, the general level of prices for nonfat milk products in the South Central area was reduced. However, when sales were small prices increased relative to Chicago area prices.

The Chicago area price series reflected changes in the prices of plain condensed skim milk in the South Central area less adequately than it did nonfat dry milk prices. Since the largest part of the sales of skim milk products by plants in the area were in this form, the divergence of prices from the Chicago price series would be of some importance. Also, since all plants did not produce the same proportions of each type of product, changing price relationships indicate changes in the competitive positions of the plants.

Prices Received by Large Sellers, 1951-54

A few plants furnished information about their prices and sales of skim milk products in 1952-54. Prices of nonfat dry milk in the South Central area, by these indications, were above prices received at plants in the Chicago area in 1951 and 1952, dropped below Chicago area prices in 1953, then about equalled the Chicago area prices in 1954 (table 8). The widest differences were in 1953, when the South Central area prices were 0.7 and 0.8 cents per pound below Chicago area prices for spray and roller process nonfat dry milk, respectively.

Table 8.--Skim milk products: Prices received by large sellers, South Central area, and prices of spray and roller process nonfat dry milk at Chicago, 1951-1954

Year	Plain condensed skim milk, South Central[1]	Spray process nonfat dry milk		Roller process nonfat dry milk	
		South Central[2]	Chicago[3]	South Central[2]	Chicago[3]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*
1951.....	14.7	15.1	14.5	13.0	12.8
1952.....	16.4	16.7	16.4	14.7	14.7
1953.....	14.1	15.1	15.8	12.3	13.1
1954.....	13.6	15.0	15.1	13.1	13.2

[1] Three plants in 1951-53, two plants in 1954.
[2] Two plants.
[3] Prices at plants in the Chicago area, AMS Dairy and Poultry Market News Service.

Total production of skim milk products increased moderately (15 percent) over the period 1951-54 at the South Central area plants for which data were available (table 9). Production of roller process nonfat dry milk fell 50 percent, but this was more than offset by the increases in serum solids in plain condensed skim milk and spray process nonfat dry milk. By contrast, the combined total U. S. production of the 3 products more than doubled; even the output of roller process nonfat dry milk increased nationally.

Table 9.--Skim milk products: Quantities sold by large sellers, South Central area, and U. S. production, 1951-54

Year	Sales by large sellers, South Central area[1]			
	Plain condensed skim milk[2]	Spray process nonfat dry milk	Roller process nonfat dry milk	Total
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1951.....	5,412	4,354	4,036	11,877
1952.....	4,266	4,012	2,011	10,948
1953.....	4,993	6,178	2,126	13,399
1954.....	6,366	6,235	1,937	13,636
	Production, United States			
1951.....	65,505	546,387	156,089	767,981
1952.....	178,536	665,076	198,144	1,041,756
1953.....	203,381	971,578	242,196	1,417,155
1954.....	223,122	1,158,537	243,837	1,625,496

[1] Data for 3 firms selling plain condensed skim milk, 2 firms selling spray process nonfat dry milk, and 2 firms selling roller process nonfat dry milk.
[2] Serum solids content, calculated as 35 percent of the product weight.

Comparisons of Prices at Individual Plants

Among individual plants there was a wide range of prices for each product (table 10). The annual average price at all plants was highest for spray process nonfat dry milk, lowest for roller process nonfat dry milk, and intermediate for condensed skim milk. But among plants the range of prices for plain condensed skim milk was wider than for either of the other products. Consequently, the plant which received the highest prices for condensed skim milk received more than the highest price for spray process nonfat dry milk. The plant with the lowest average price for roller process nonfat dry milk had a higher selling price than the lowest price for plain condensed skim milk. Within the ranges the plants were quite evenly distributed--no single price was closely representative of a majority of sellers.

Prices Associated with Type of Buyer

There was a range of 4 cents per pound of serum solids in plain condensed skim milk between the highest and lowest plant average prices in 1951, disregarding one plant which sold in only one month (table 11). This fact, and the ranges in prices of the other products also, could be a result of several influences: The kinds of buyers; whether or not the selling plant was regulated under a Federal milk marketing order; the part of the area in which the selling plant was located; and such characteristics of sellers' services as prompt delivery, assured supply, consistent or outstanding quality, etc.

Buyers making purchases in the South Central area were classified according to their type of operations. The prices paid by these buyers varied among the various sellers of each skim milk product (Appendix tables 24, 25, and 26). Individual sellers having relatively low or relatively high selling prices tended to maintain the same level of price regardless of the type of buyer. However, sales to buyers having fluid milk operation but no manufacturing operation were consistently made at prices higher than the seller's prices to other buyers. Buyers with fluid milk and ice cream manufacturing operations tend to pay more than buyers without a fluid milk operation, but in this case the relationship was not consistent for all sellers.

Table 10.--Skim milk products: Average prices per pound at individual plants, South Central area, 1951

Plant[1]	Plain condensed skim milk	Spray process nonfat dry milk	Roller process nonfat dry milk
	Cents	*Cents*	*Cents*
Highest.....	[2] 17.5	[3] 19.0	[4] 15.0
2.....	16.1	15.9	[5] 15.0
3.....	15.9	15.5	[5] 14.5
4.....	15.4	15.1	14.4
5.....	15.2	15.0	13.7
6.....	[2] 15.0	14.8	13.0
7.....	14.9	14.6	---
8.....	13.8	14.3	---
9.....	13.6	---	---
10.....	[6] 13.1	---	---
Lowest.....	12.0	13.6	12.7

[1] Plants are arrayed from highest to lowest average weighted plant price for each product. Thus the plant receiving the highest price for plain condensed skim milk was not necessarily the plant receiving the highest price for spray process nonfat dry milk or roller process nonfat dry milk.
[2] Sales only in one month.
[3] Sales in 6 months.
[4] Sales in 9 months.
[5] Sales in 7 months.
[6] Sales in 8 months.

Sellers and buyers of plain condensed skim milk were grouped according to their type of operation. It was then found that buyers of a given type tended to pay the same price regardless of the type of seller from whom they purchased (table 12).

The price of nonfat dry milk, on the other hand, tended to be more consistent among types of buyers than did prices by type of seller. This again emphasizes the wider range of the nonfat dry milk market. As plain condensed skim milk was produced and sold within a limited geographic area and with relatively less competition from supplies from other areas, sellers could determine their prices with greater independence, but they then must necessarily follow the stated policy of producing plain condensed skim milk in quantities varying with the local demand.

Prices Received by Regulated and Nonregulated Sellers

Nonregulated sellers as a group received higher prices per pound of serum solids for both plain condensed skim milk and spray process nonfat dry milk than did regulated plants (table 13). The price received for roller process nonfat dry milk for the regulated sellers was higher than for the nonregulated sellers. The quantities of nonfat dry milk sold by regulated sellers were small (table 2). Most of their sales were made during periods when the price was seasonally lower.

Relationships Between Quantities Sold and Prices of Skim Milk Products

Quantities of plain condensed skim milk sold were more uniform throughout the year than were either spray or roller process nonfat dry milk. As stated previously, plain condensed skim milk was produced and sold mainly in response to local demand. All sellers of roller process nonfat dry milk had fluid milk operations or acted as surplus milk disposal plants for other fluid milk plants. Thus, sales of roller process nonfat dry milk tended to be controlled by the availability of skim milk for these manufacturing operations.

Table 11.--Skim milk products: Ranges in prices received by individual plants, and average of all plants, South Central area, 1951

Month	Plain condensed skim milk			Spray process nonfat dry milk			Roller process nonfat dry milk		
	High[1]	Low[1]	Average[2]	High[1]	Low[1]	Average[2]	High[1]	Low[1]	Average[2]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
January.....	16.0	11.0	13.9	14.4	11.6	13.2	14.5	11.1	11.7
February.....	16.0	11.0	14.2	14.5	11.5	13.7	14.1	11.3	11.7
March.....	16.0	11.1	14.3	15.8	11.9	14.1	15.0	11.4	12.2
April.....	16.0	11.0	14.3	16.3	13.8	15.2	16.1	12.9	13.4
May.....	16.0	11.6	14.1	16.5	14.5	15.6	15.8	13.2	13.7
June.....	16.0	11.9	14.0	16.5	14.5	15.4	16.2	12.8	13.5
July.....	17.5	12.0	14.1	16.5	14.9	15.3	15.5	13.0	13.4
August.....	16.0	12.0	14.3	16.6	14.8	15.3	16.5	13.1	13.2
September.....	16.4	12.6	14.7	17.1	14.9	15.3	16.5	13.1	13.6
October.....	16.6	12.9	15.1	16.6	15.2	15.8	15.0	13.1	13.8
November.....	16.6	13.3	15.1	16.8	15.3	16.0	15.0	13.5	14.0
December.....	17.0	14.0	15.7	16.6	15.2	16.1	15.6	14.3	14.7
Average[3].....	16.4	12.0	14.4	16.2	14.0	15.0	15.5	12.7	13.3

[1] High and low prices are the weighted average prices at individual plants.
[2] Weighted average.
[3] Simple average of monthly prices.

Table 12.--Skim milk products: Price per pound by type of seller and type of buyer, South Central area, 1951

Type of product sold	Type of buyer--plain condensed skim milk						
	Fluid milk with ice cream	Multiple use manufacturing with ice cream	Ice cream	Bakery	Meat Packer	All other	All types
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Fluid milk with multiple use manufacturing and ice cream	15.6	[1] (13.1)	14.3	---	---	14.2	14.6
Fluid milk with multiple use manufacturing and no ice cream	15.4	([2])	(14.5)	---	---	14.2	15.1
All other	(13.8)	([2])	14.3	([2])	---	(14.0)	13.9
All types	15.4	13.5	14.3	([2])	---	14.1	14.4
	Spray process nonfat dry milk						
Fluid, manufacturing, ice cream	15.5	(14.2)	15.9	15.7	14.2	14.3	14.8
Fluid, manufacturing	(14.3)	---	(15.3)	([2])	([2])	14.5	14.6
All other	15.7	(14.5)	14.9	15.5	14.9	15.0	15.1
All types	15.4	14.4	15.0	15.5	14.5	14.8	15.0
	Roller process nonfat dry milk						
Fluid, manufacturing, ice cream	([2])	([2])	([2])	(15.4)	13.9	(13.5)	14.1
Fluid, manufacturing	([2])	---	([2])	(12.8)	(12.8)	12.3	12.7
All other	([2])	(14.3)	13.3	(12.6)	13.6	13.1	13.3
All types	13.7	(14.3)	13.3	12.9	13.6	13.0	13.3

[1] Figures in parentheses represent either sales to only 3 to 9 buyers, or sales of 30,000 to 100,000 pounds, or both.

[2] Average prices not shown, being based on sales to fewer than 3 buyers, or of less than 30,000 pounds, or both.

Table 13.--Skim milk products: Prices received per pound, by status of seller under Federal milk marketing orders, South Central area, 1951

Status under Federal milk marketing orders	Plain condensed	Spray powder	Roller powder
	Cents	*Cents*	*Cents*
Regulated	14.3	13.6	14.8
Nonregulated	14.5	15.1	13.2
All sellers	14.4	15.0	13.3

From January through March 1951, the Government was purchasing nonfat dry milk solids at 12.5 and 10.5 cents per pound, respectively, for spray and roller process nonfat dry milk. In March, the average market price for these products in the South Central area was about 1.7 cents above Government purchase prices. On April 1, the Government purchase prices were raised 2.5 cents per pound to 15 and 13 cents per pound for spray and roller process nonfat dry milk, respectively, but prices in the South Central area only increased about 1.2 cents. Prices of plain condensed skim milk did not increase, even declined slightly through May and June. With the decided decrease in the sales of both spray and roller process nonfat dry milk during November and December, prices increased to 1.1 and 1.7 cents above Government purchase prices for spray and roller process nonfat dry milk, respectively. This time the price of plain condensed skim milk also increased by about the same amount (fig. 2, page 11).

In general, prices for nonfat dry milk tended to fluctuate within narrow ranges from Government purchase prices. Prices for plain condensed skim milk, being more dependent upon local supply-demand conditions, tended to move independently of Government purchase prices for the other serum solids products.

The stability of prices of plain condensed skim milk implies that if a certain predetermined price cannot be realized sellers in this area will produce other skim milk products or divert the skim milk to other plants. The necessary price may be related to the costs of processing and the prices established for surplus milk under the orders.

Seasonal Price Changes

Prices of skim milk products had a weak seasonal pattern. Over the 4-year period 1951-54 there were consistent declines in the prices of spray and roller process nonfat dry milk during the April-June quarter (fig. 3). Prices of plain condensed skim milk responded less to seasonal factors than did the price of nonfat dry milk. The difference might have been even more pronounced if the Government purchase prices had not been effective, or had varied seasonally.

The difference in seasonal pattern among skim milk products is apparently another aspect of the special characteristics of plain condensed skim milk, including its production primarily for the local market.

Effect of Individual Seller's Prices on Changes in Average

The average weighted price may change from one month to the next, even though each individual seller maintained the same price. Such a price change would result from a change in the proportions sold by sellers whose prices may be above or below the average. For example, the weighted average price of plain condensed skim milk decreased from April to May and from May to June. During this period sellers with the lowest prices increased their proportion of total sales (table 14). Actually only 4 of the 9 plants had decreases in average plant prices, 4 had increased prices, while one plant kept the same price. Likewise, the increase in price in December came at the time when plants with higher than average prices increased their proportion of total sales, although in this instance all plants increased their prices.

Range of Prices for Individual Sales

During 1951 sales of plain condensed skim milk were made at prices as low as 11.0 cents, and as high as 21.5 cents per pound of serum solids, a range of 10 1/2 cents. In any one month the range was usually narrower than this, as little as 6 cents in May and June on up to the full 10 1/2 cents in December (fig. 4).

The range in which the bulk of the sales were made each month was 4 to 6 cents. Over this range, the quantities sold at each price were roughly the same.

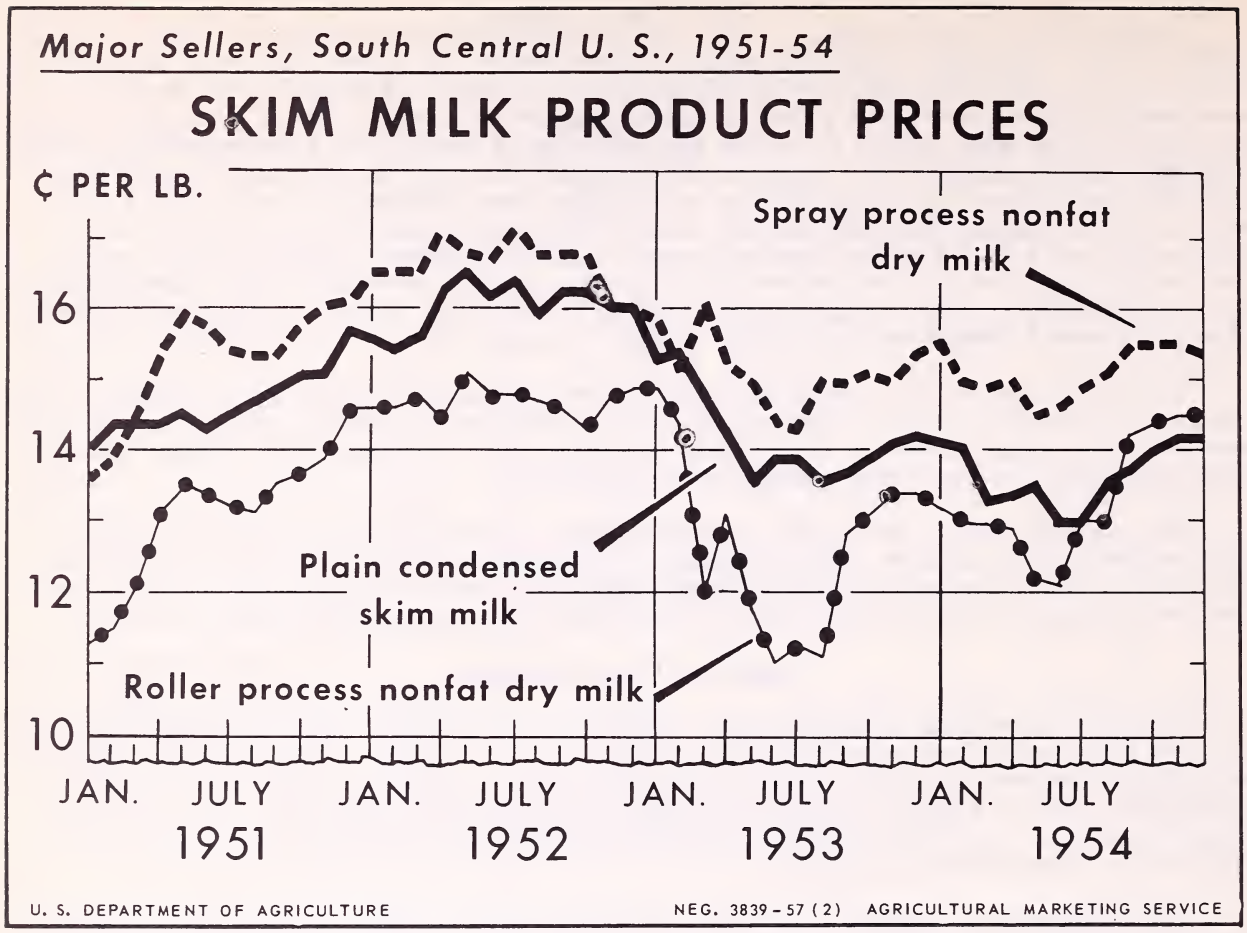
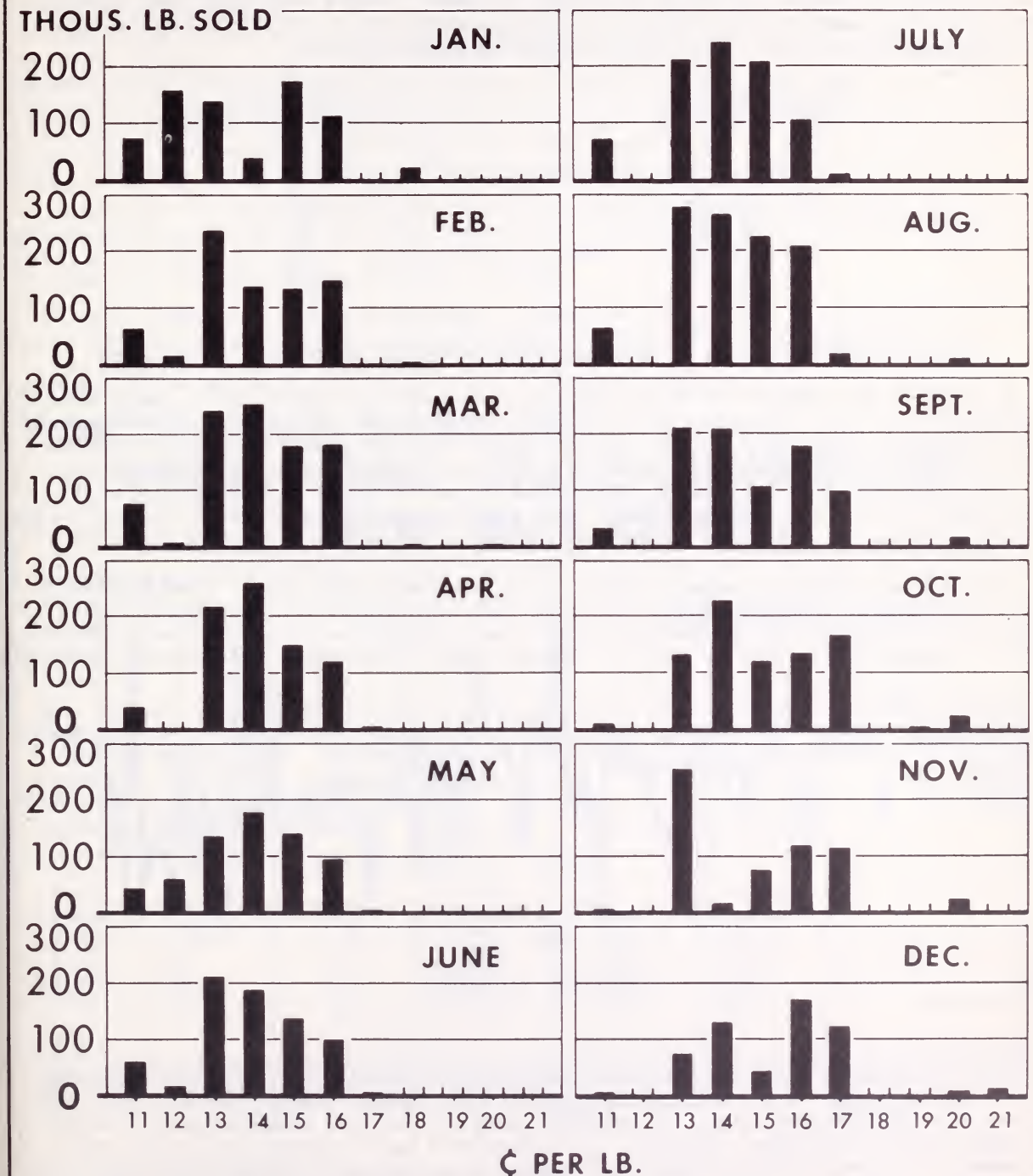


Table 14.--Plain condensed skim milk: Prices and proportion of total sales by sellers with high and low prices, South Central area, by months, 1951

Month	Proportion of total sales		Average weighted price
	High price sellers	Low price sellers	
	Percent	*Percent*	*Cents*
January	50.2	49.8	13.9
February	46.4	53.6	14.2
March	50.9	49.1	14.3
April	50.3	49.7	14.3
May	46.6	53.4	14.1
June	42.9	57.1	14.0
July	51.6	48.4	14.1
August	44.6	55.4	14.3
September	45.1	54.9	14.7
October	52.1	47.9	15.1
November	51.9	48.1	15.1
December	55.9	44.1	15.7

In South Central U. S., 1951

PLAIN CONDENSED SKIM MILK SOLD AT SPECIFIED PRICES



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These features of plain condensed skim milk prices--the range, and the distribution within the range--would be important factors in reporting a current market price. The average price in April was 14.3 cents, but only 27 percent of the product was sold at 14.0 cents. About half of the sales were made at either 13.0 cents, or less, or 16.0 cents, or more.

The range of prices in any given month was partly a result of differences among sellers. But each seller also made sales over a range. The 11 sellers of plain condensed skim milk made sales in 106 months out of the possible 132 (11 sellers x 12 months). The ranges of prices in the 106 "seller-months" were as follows:

Range in price Cents per pound	Number of "seller - months"
0	17
1/4 - 1	13
1 - 1 3/4	20
2 - 2 3/4	21
3 - 3 3/4	15
4 - 4 3/4	20
Total	106

Prices and Movement of Skim Milk Products Within the South Central Area

In order to see whether the South Central U. S. could be considered a single area, or whether there were important differences for purposes of marketing serum solids, it was divided into 3 subareas. There were 8 sellers of serum solids in subarea I (Northeastern Kansas and Northwestern Missouri); 3 sellers in subarea II (the Southeastern 1/4 of Kansas); and 4 in subarea III (Oklahoma). Subarea I produced 70 percent of the total production of plain condensed skim milk in the South Central area, 87 percent of the spray process nonfat dry milk, and 84 percent of the roller process nonfat dry milk.

Prices were highest in subarea III for plain condensed skim milk, subarea I for spray, and subarea II for roller process nonfat dry milk (table 15). The dominant influence of subarea I in total production means that weighted prices for the South Central area are largely determined by prices in Northeastern Kansas and Northwestern Missouri.

Table 15.--Skim milk products: Prices by location of seller, South Central area, 1951

Subarea	Plain condensed		Spray process nonfat dry milk		Roller process nonfat dry milk	
	Quantity	Price	Quantity	Price	Quantity	Price
	1,000 pounds	*Cents*	*1,000 pounds*	*Cents*	*1,000 pounds*	*Cents*
I.....	6,378	14.1	7,747	15.1	4,446	13.4
II.....	1,712	15.1	622	14.6	34	14.4
III.....	1,019	15.4	577	13.6	834	12.3
All subareas.....	9,109	14.4	8,947	15.0	5,314	13.3

The movement of skim milk products outside the South Central area was generally to the south and west. For example, subarea III (Oklahoma) made no sales of plain condensed skim milk in Kansas and Missouri and only a relatively small volume of nonfat dry milk. These two States, however, were important sales outlets for all skim milk products for subarea I. Sales outlets in Texas were important to all subareas and for all products. This indicated a close competitive price relationship among the subareas.

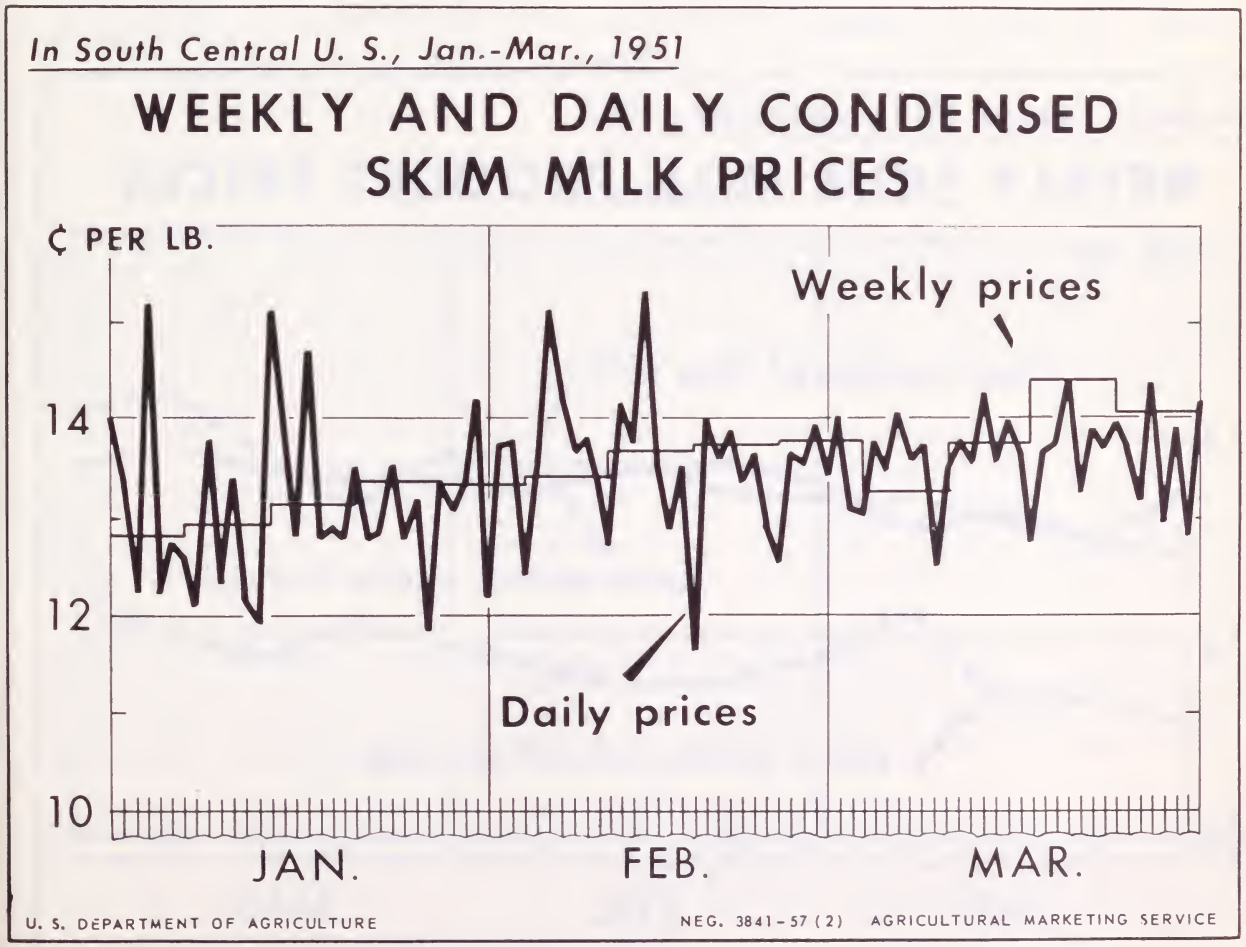
Sales of plain condensed skim milk by plants in all subareas went mainly to Texas. Sales of spray and roller process nonfat dry milk from all subareas were more widely dispersed. Considering, therefore, that the pattern of sales for plain condensed skim milk was similar among subareas, and that the volume of sales of all 3 products was relatively small in subareas II and III, it would be appropriate to treat the plants in the South Central U. S. as belonging to a single area.

DAILY AND WEEKLY PRICE CHARACTERISTICS OF SERUM SOLIDS PRODUCTS

One criticism of present methods of pricing surplus milk is that some formulas do not reflect changes in local supply-demand conditions promptly. A possible improvement would be to base prices upon daily, weekly, or monthly prices that could be reported from the local area. In the earlier study of prices for butterfat in cream sold by sellers in the South Central area it was found that daily and weekly prices fluctuated erratically. In part this resulted from the fact that there was a wide range of prices at any given time, with large quantities being sold near both limits of the range.

Similarly, the daily weighted average prices for plain condensed skim milk for the period January through March 1951 fluctuated as much as 3 cents from one day to the next (fig. 5). Daily prices for plain condensed skim milk had a range of 1 to 3 cents or more during each week of the 3-month period.

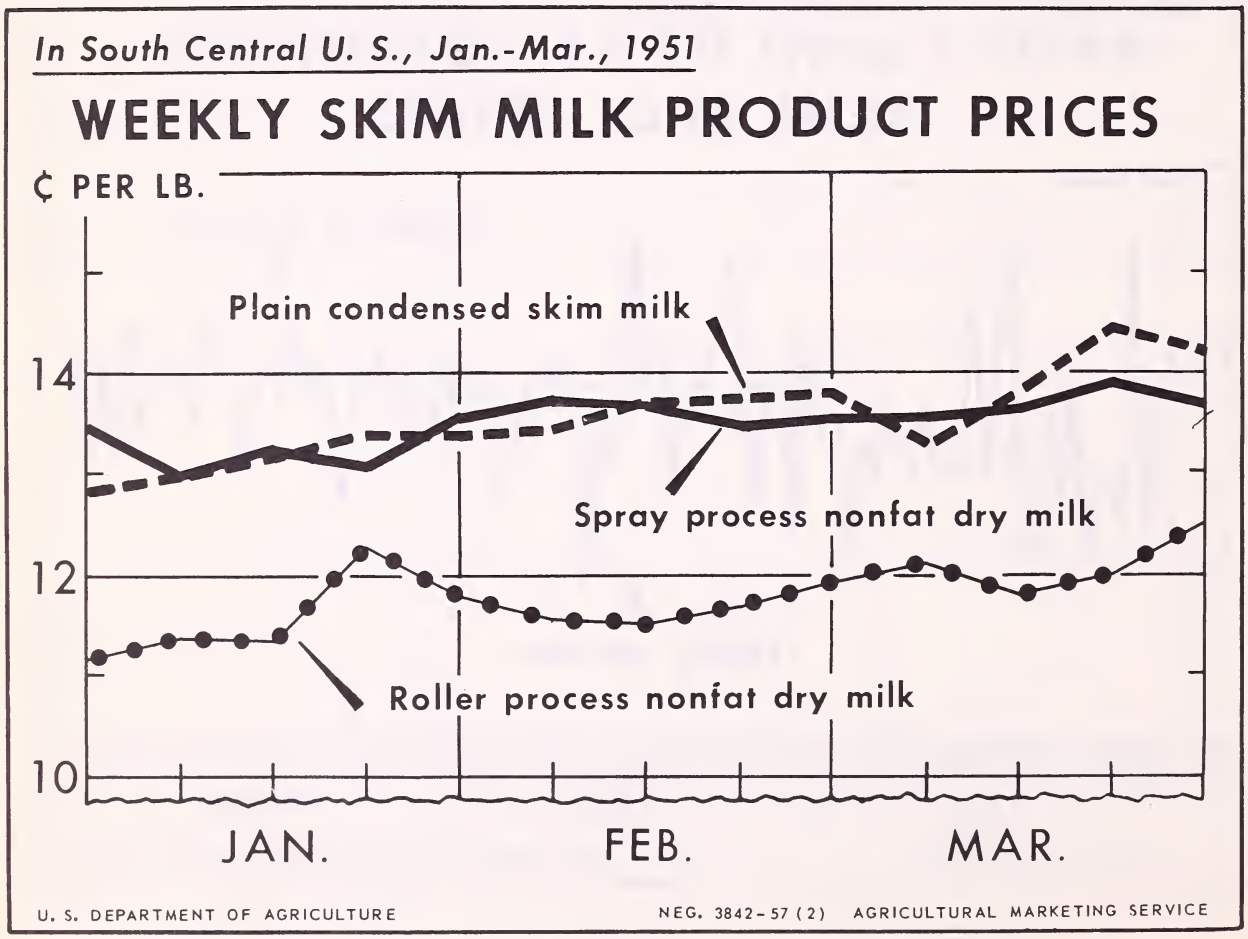
For the same 3-month period weekly average prices of plain condensed skim milk were relatively steady, changing by less than 0.3 cent in all but 2 weeks (fig. 5).



Prices of the various skim milk products (table 16 and fig. 6) showed the same general upward trend from January through March in the weekly averages as in the monthly prices, with fluctuations around the general trend.

Table 16.--Skim milk products: Prices per pound in the South Central area, by weeks, January through March 1951

Average for week ending	Plain condensed skim milk	Spray process nonfat dry milk	Roller process nonfat dry milk
	Cents	*Cents*	*Cents*
January 6	13.5	12.8	11.2
13	13.0	13.0	11.4
20	13.2	13.1	11.3
27	13.0	13.4	12.3
February 3	13.5	13.4	11.8
10	13.7	13.4	11.5
17	13.6	13.7	11.5
24	13.5	13.7	11.7
March 3	13.5	13.8	11.9
10	13.5	13.3	12.1
17	13.6	13.8	11.8
24	13.9	14.4	12.0
31	13.6	14.1	12.5



Sizes and numbers of sales during the 3-month period January through March corresponded closely with the data characteristics for the entire year of 1951 (table 17). There were relatively few daily sales each day and large quantities per sale. The 11 sellers of plain condensed skim milk averaged about 25 sales a day, which compares with about 35 sales of cream a day by 19 firms. Sales of spray and roller process nonfat dry milk were far fewer, about 6 a day of the spray product and 2 to 3 a day of the roller product on the average in 1951. As far as numbers of sales are concerned, a daily report on prices of plain condensed skim milk might be as appropriate for the South Central area as a daily report on cream prices. Nonfat dry milk sales were so few in number as to cast doubt on the value of even a weekly price report.

Table 17.--Skim milk products: Average number of sales and average quantities sold per day and per sale for various serum solids products in the South Central area, January-March, and April-December 1951

Type of product	Sales per day		Quantity per day		Quantity per sale	
	January-March	April-December	January-March	April-December	January-March	April-December
	Number	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Plain condensed skim milk.....	24.9	26.8	26,263	24,527	1,054	917
Spray process nonfat dry milk....	6.4	6.1	26,346	23,911	4,102	3,930
Roller process nonfat dry milk.	2.5	1.9	12,120	15,357	4,913	8,014

APPRAISAL

There were relatively few plants manufacturing and selling plain condensed skim milk and spray and roller process nonfat dry milk in the area covered by this study. Of 23 plants selling either or both cream and skim milk products, only 15 made some sales of the skim milk products. There were large numbers of buyers from whom price information might be obtained: In Kansas, Missouri, and Oklahoma, the 15 firms dealt with 107 buyers of plain condensed skim milk, 201 buyers of spray process nonfat dry milk, and 69 buyers of roller process nonfat dry milk.

Of the 15 firms selling skim milk products, 8 were regulated under one of the Federal milk marketing orders in the area. The 8 plants accounted for about 18 percent of the sales of all skim milk products in 1951, but 7 regulated plants selling plain condensed skim milk accounted for 30 percent of the sales of that product, while 2 regulated plants selling roller process nonfat dry milk sold only 2 percent of the sales of that product.

Prices received for plain condensed skim milk by regulated sellers averaged slightly lower than those received by unregulated sellers (respectively, 14.3 and 14.5 cents per pound of serum solids). But the range of prices among sellers was so wide in either category that not much significance can be attached to the difference in average prices. Some regulated sellers of each of the products received prices as high as or higher than any unregulated sellers.

Average prices of skim milk products differed among types of buyers. Most notably, sales of plain condensed skim milk to buyers having only a fluid milk operation tended to be at higher prices than for sales to other types of buyers. Prices of nonfat dry milk did not vary as much among types of buyers as did plain condensed skim milk. Again, there was a wide range in the prices to any given type of buyer, which minimizes the significance of the differences among the averages.

Seasonal changes in prices of the different products were not parallel, nor did they follow the national market as reflected by prices at Chicago. Because prices of different products within the area diverged from time to time, the marketing advantage shifted from one type of plant to another. This is a situation which could be handled only by pricing each use separately.

During 1951 the value of plain condensed skim milk changed nearly 2 1/4 cents per pound from its highest to its lowest relative to spray process nonfat dry milk--from 0.7 cent over in January to 1.5 cents under in May. This is equivalent to about 18 cents a hundred pounds of milk. The relative values of spray and roller process nonfat dry milk changed only about three-fourths cent per pound during the year, equivalent to 6 cents a hundred pounds of milk, Relative to prices at Chicago, the values of spray process nonfat dry milk also fluctuated about three-fourths cent a pound during 1951.

Over the 4 years 1951-54, the relative values of the products, in terms of annual average prices, changed by about 1 to 1 1/4 cents a pound, or 7 to 10 cents a hundred pounds of milk equivalent. Plain condensed skim milk was highest relative to spray process nonfat dry milk in 1952, and to roller process nonfat dry milk in 1953. It was lowest in 1954 relative to both types of nonfat dry milk. In relation to prices at Chicago, the South Central area price of spray process nonfat dry milk was higher by 0.6 cent a pound in 1951 and lower by 0.7 cent a pound in 1953. The change of 1.3 cents is equivalent to about 10 1/2 cents a hundred pounds of skim milk.

Table 18.--Skim milk products: Sales to major type of buyers, South Central area, by months, 1951

Type of buyer	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Plain Condensed Skim Milk												
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Fluid milk and ice cream plant..	259	230	246	210	178	190	250	265	266	305	236	200	2,835
Ice cream plant....	136	138	186	191	221	247	253	316	258	198	113	125	2,382
Manufacturing with. ice cream.....	106	111	154	131	101	79	96	210	104	67	53	63	1,275
All other.....	200	247	351	249	136	181	225	267	205	220	178	158	2,617
Total.....	701	726	937	781	636	697	824	1,058	833	790	580	546	9,109
	Spray process nonfat dry milk												
Bakery.....	191	133	214	192	420	160	206	195	227	203	124	119	2,384
Meat Packer.....	167	105	101	119	72	97	107	90	87	84	18	40	1,087
Ice cream plant....	59	79	91	57	74	32	106	116	145	135	45	36	975
Fluid milk and ice cream plant..	62	93	96	56	92	83	106	53	106	46	44	12	849
Manufacturing with. ice cream.....	135	138	77	161	42	46	60	107	131	68	40	47	1,052
All other.....	330	130	171	154	152	329	404	206	433	118	104	69	2,600
Total.....	944	678	750	739	852	747	989	767	1,129	654	375	323	8,947
	Roller process nonfat dry milk												
Ice cream plant....	80	83	239	123	223	187	81	292	170	97	178	168	1,921
Meat packer.....	78	85	90	41	54	99	29	60	103	134	53	40	866
Bakery.....	87	89	45	52	57	57	96	56	80	42	47	55	763
Fluid milk and ice cream plant..	4	1	1	6	4	63	26	50	61	72	28	10	326
All other.....	49	133	26	74	21	212	183	88	151	245	228	28	1,438
Total.....	298	391	401	296	359	618	415	546	565	590	534	301	5,314

Table 19.--Plain condensed skim milk: Quantity sold and average prices, all sellers and largest sellers, South Central area, by months, 1951

Month	All sellers		Five largest sellers	
	Quantity sold	Price	Quantity sold	Price
	1,000 pounds	Cents	1,000 pounds	Cents
January	701	13.9	604	14.0
February	726	14.2	638	14.4
March	937	14.3	854	14.4
April	781	14.3	674	14.4
May	636	14.1	481	14.4
June	697	14.0	548	14.3
July	824	14.1	516	14.5
August	1,058	14.3	783	14.7
September	833	14.7	674	14.9
October	790	15.1	673	15.1
November	580	15.1	485	15.1
December	546	15.7	444	15.7
Total	9,109	14.4	7,374	14.6

Table 20.--Spray process nonfat dry milk: Quantity sold and average prices, all sellers and largest sellers, South Central area, by months, 1951

Month	All sellers		Four largest sellers	
	Quantity sold	Price	Quantity sold	Price
	1,000 pounds	Cents	1,000 pounds	Cents
January	944	13.2	664	13.6
February	678	13.7	544	13.9
March	750	14.1	556	14.5
April	739	15.2	584	15.4
May	852	15.6	660	15.9
June	747	15.4	473	15.8
July	989	15.3	623	15.4
August	767	15.3	522	15.3
September	1,129	15.3	938	15.3
October	654	15.8	540	15.8
November	375	16.0	317	16.0
December	323	16.1	270	16.1
Total	8,947	15.0	6,691	15.2

Table 21.--Roller process nonfat dry milk: Quantity sold and average prices, all sellers and largest sellers, South Central area, by months, 1951

Month	All sellers		Three largest sellers	
	Quantity sold	Price	Quantity sold	Price
	1,000 pounds	*Cents*	*1,000 pounds*	*Cents*
January	298	11.7	218	11.3
February	391	11.7	320	11.5
March	401	12.2	343	12.1
April	296	13.4	254	13.1
May	359	13.7	321	13.5
June	618	13.5	576	13.4
July	415	13.4	378	13.2
August	546	13.2	528	13.1
September	565	13.6	521	13.5
October	590	13.8	527	13.7
November	534	14.0	498	13.9
December	301	14.7	268	14.6
Total	5,314	13.3	4,752	13.2

Table 22.--Plain condensed skim milk: Prices per pound received by individual sellers, by type of buyer, South Central area, 1951

Individual seller designation	Type of buyer			
	Fluid milk with ice cream	Ice cream	All other buyers	All buyers
	Cents	*Cents*	*Cents*	*Cents*
A	14.3	14.4	13.2	13.6
B	15.6	14.3	14.2	14.9
C	16.0	16.1	16.5	16.1
D	13.8	14.0	14.0	13.8
E	15.9	15.9	16.2	15.9
F	15.5	15.4	15.2	15.4
G	11.8	12.0	14.0	12.0
H	15.3	15.0	15.0	15.2
I	14.8	14.8	14.0	13.1
J	17.5	17.5	---	17.5
K	15.0	---	---	15.0
All sellers	15.4	14.3	13.8	14.4

Table 23.--Spray process nonfat dry milk: Prices per pound received by individual sellers, by type of buyer, South Central area, 1951

Individual seller designation	Type of buyer						
	Fluid milk and ice cream	Ice cream	Meat packer	Mfg. with ice cream	Bakery	All other	All types
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
A	14.7	15.5	14.5	14.2	---	16.6	14.3
B	15.1	15.5	15.1	15.0	15.2	14.7	15.1
C	14.3	15.3	15.3	---	19.4	14.4	14.6
D	15.4	15.3	15.1	14.4	15.3	15.2	15.0
E	15.0	14.6	15.2	14.4	15.1	14.8	14.8
F	15.0	15.9	13.3	---	---	13.5	13.6
G	15.8	16.5	14.7	14.3	15.8	15.1	15.5
H	17.1	17.5	17.6	18.0	15.8	15.1	15.9
I	---	---	---	---	---	19.0	19.0
All sellers	15.4	15.0	14.5	14.4	15.5	14.8	15.0

Table 24.--Roller process nonfat dry milk: Prices per pound received by individual sellers, by type of buyer, South Central area, 1951

Seller designation	Type of buyer					
	Meat packer	Fluid milk with ice cream	Bakery	Ice cream	All other	All buyers
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
A	13.7	15.8	---	---	13.4	13.7
B	13.5	13.6	12.6	13.1	12.7	13.0
C	12.8	---	12.8	---	12.2	12.7
D	15.0	15.1	---	---	15.0	15.0
E	14.6	15.4	15.4	---	15.2	15.0
F	---	---	---	14.2	14.9	14.5
G	---	---	---	---	14.4	14.4
All sellers	13.6	13.7	12.9	13.3	13.1	13.3

Table 25.--Plain condensed skim milk: Quantities sold in various States from subareas of South Central area, 1951

States	Subarea			Total
	I	II	III	
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Kansas	709	452	---	1,161
Oklahoma	174	19	271	464
Texas	2,488	1,033	742	4,263
Missouri	1,856	60	---	1,916
Nebraska	729	---	---	729
All others	422	148	6	576
Total	6,378	1,712	1,019	9,109

Table 26.--Spray process nonfat dry milk: Quantities sold in various States from subareas in South Central area, 1951

States	Subareas			Total
	I	II	III	
	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds
Missouri	2,890	---	---	2,890
Kansas	2,327	136	25	2,488
Texas	471	387	110	968
Nebraska	627	---	---	627
Oklahoma	100	37	420	557
Illinois	383	---	---	383
Arkansas	296	---	2	298
All others	653	63	20	736
Total	7,747	623	577	8,947

Table 27.--Roller process nonfat dry milk: Quantities sold in various States from subareas in the South Central area, 1951

State	Subareas			Total
	I	II	III	
	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds
Kansas	538	24	9	571
Oklahoma	248	---	759	1,007
Texas	335	---	59	394
Missouri	654	---	7	661
Alabama	440	---	---	440
Louisiana	409	---	---	409
Pennsylvania	396	---	---	396
All other	1,426	10	---	1,436
Total	4,446	34	834	5,314

Table 28.--Skim milk products: Prices per pound, by days, January-March 1951

Day	Plain condensed skim milk			Spray powder			Roller powder		
	January	February	March	January	February	March	January	February	March
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1.....	14.0	13.8	14.0	---	13.4	13.7	11.2	11.9	---
2.....	13.4	13.8	13.1	12.8	11.8	13.5	13.2	11.0	11.2
3.....	12.3	12.4	13.0	12.9	14.0	14.3	10.5	11.0	12.0
4.....	15.2	13.5	13.8	13.3	---	---	11.9	---	---
5.....	12.2	15.1	13.5	12.7	13.3	12.4	11.0	12.0	12.1
6.....	12.8	14.2	14.1	13.6	14.1	13.1	11.0	10.8	12.1
7.....	12.6	13.7	13.6	13.0	14.8	13.6	---	11.1	11.9
8.....	12.1	13.8	13.8	12.9	13.2	13.0	11.5	12.5	10.8
9.....	13.8	13.4	12.5	12.7	13.5	14.0	11.1	11.9	12.3
10.....	12.3	12.7	13.5	13.3	13.3	14.2	12.3	12.5	12.5
11.....	13.4	14.2	13.8	14.1	---	---	11.8	---	---
12.....	12.1	13.8	13.6	11.8	13.5	14.1	11.6	11.2	11.6
13.....	11.9	15.3	14.3	14.0	13.7	13.9	12.5	13.1	11.5
14.....	15.1	13.6	13.6	---	14.3	14.6	---	11.2	12.0
15.....	12.8	12.9	14.0	13.2	12.1	13.5	11.4	---	11.8
16.....	14.7	13.5	13.7	12.4	13.5	14.2	11.5	11.2	11.5
17.....	12.8	11.6	12.8	14.0	14.1	---	11.3	12.0	12.0
18.....	12.9	14.0	13.7	13.4	---	14.3	12.2	---	---
19.....	12.8	13.6	13.8	13.2	13.6	13.3	11.8	12.1	11.5
20.....	13.5	13.9	14.4	13.5	14.2	15.0	11.1	11.3	13.4
21.....	12.8	13.4	13.3	14.0	13.7	13.7	---	11.5	11.5
22.....	12.8	13.6	13.9	13.1	13.5	14.3	12.3	11.6	11.5
23.....	13.5	12.9	13.7	13.7	14.0	15.5	14.5	11.5	11.5
24.....	12.8	12.6	14.0	13.3	13.3	15.6	11.6	11.0	12.1
25.....	13.2	13.7	13.7	12.6	13.5	---	12.0	---	---
26.....	11.8	13.6	13.2	13.7	14.5	13.0	12.3	11.4	11.1
27.....	13.3	14.0	14.4	13.2	13.6	14.0	14.4	12.1	---
28.....	13.1	13.4	12.9	---	13.8	15.1	---	13.0	12.5
29.....	13.3	---	13.9	13.2	---	13.1	12.3	---	---
30.....	14.2	---	12.8	13.6	---	15.0	12.1	---	12.9
31.....	12.2	---	14.2	14.4	---	14.8	11.8	---	14.0

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